



Stoel Rives LLP

Inventors: Linda B. Couto, Peter C. Colosi and Xiaobing Qian

Title: ADENO-ASSOCIATED VECTOR COMPOSITIONS FOR EXPRESSION OF FACTOR VIII

Replacement Sheet

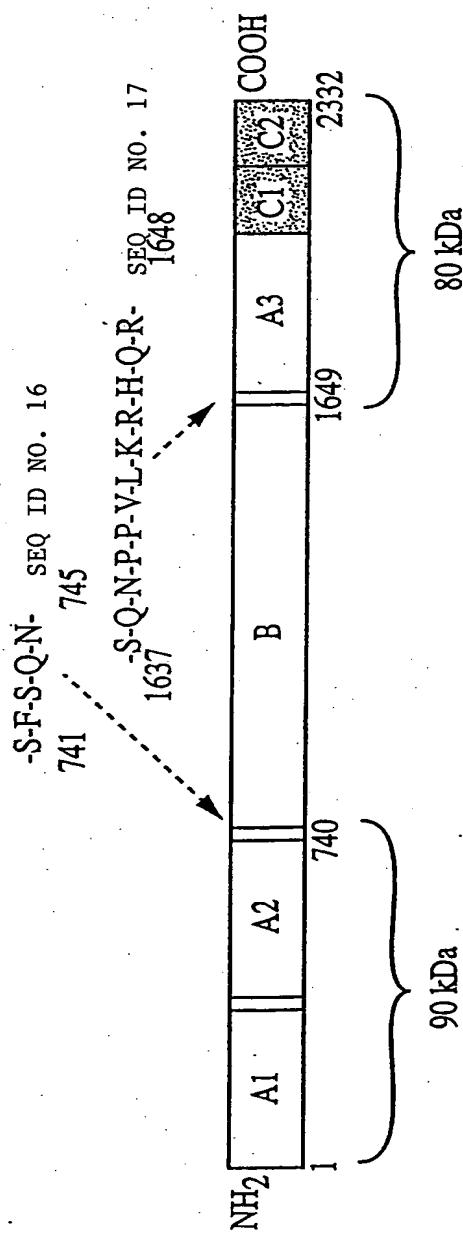


FIG. 1

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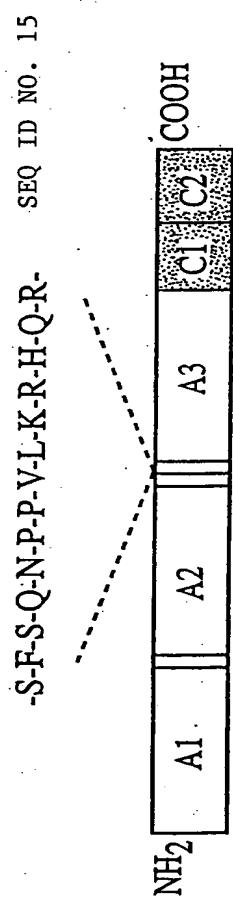


FIG. 2

Replacement Sheet

-S-F-S-Q-N-P-P-V-L-K-R-H-Q-R-

SEQ ID NO. 15

TTR	EFT	PROMOTER	A1	A2	A3	C1	C2	POLY A	TTR	
16	145 159	287 413				4786	4793	4840	4849	4978

FIG. 4

Replacement Sheet

- FIG. 5A**
- FIG. 5B**
- FIG. 5C**
- FIG. 5D**

FIG. 5

SEQ ID NO. 13

CAGCTGCGCGCTCGCTCGCTACTGAGGCCGCCGGCAAAGCCCGGGCGTCGGGCCACCTTGGTCGCCGCCCTCAGT
 GAGCGAGCGAGCGCGCAGAGAGGGAGTGGCAACTCCATCACTAGGGTTCCCTGCAGGCCAGGAATGTTGTTCTT
 AAATACCATCCAGGAATGTTGTTCTAAATACCATCCAGGAATGTTGTTCTAAATACCATCTACAGTTATTGTT
 AAAGAAGTATATTAGAGCGAGTCTTCTGCACACAGATCACCTTCCGGTGCCGCCCTAGGCAGGTAAGTGCGTGTG
 TGGTTCCCGGGCCTGGCCTTACGGTTATGCCCTGCGCTTGAATTACTGACACTGACATCCACTTTCT
 TTTCTCACAGGTATCGATTCCACCATGCAAATAGAGCTCTCACCTGCTTCTTCTGTGCCCTTTCGAGATTCTGCTT
 AGTGCCACCAGAAGATACTACCTGGGTGCACTGGAATGGACTATATGCAAAGTGAATCTGGTGAGCTGCCGTG
 GGACGCAAGATTCCCTAGAGTGCAAATCTTCAACACCTCAGTCGTGTACAAAAGACTCTGTTGAG
 AATTACCGATCACCTTCAACATCGCTAACGCCAGGCCACCCCTGGATGGGTCTGCTAGGTCTTACCATCCAGGCTGAG
 GTTTATGATACTGGTCATTACACTTAAGAACATGGCTCCATCTGTCACTGCTTGTGTTGGTGTATCCTACTG
 GAAAGCTCTGAGGGAGCTGAATATGATGATCAGACCAGTCAAAGGGAGAAAGAACATGATAAAGTCTTCCCTGGTGAA
 GCCATACATATGTCGGCAGGTCTGAAAGAGAACATGGCCAATGGCTCTGACCCACTGCTTACCTACTCATATCTT
 TCTCATGTGGACCTGGTAAAGACTTGAATTCAAGGCTCATTGGAGCCCTACTAGTATGATGAGAACGGAGTCTGGCAA
 GGAAAAGACACAGACCTTGCACAAATTACTACTTTGCTGTATTGATGAAGGGAAAGTTGGCAGTCAATGGTTATGAAAC
 AGAACCTTGTGATGCAAGGATAGGGATGCTGCATCTGCTCGGGCTGGCTAAACATGACACAGTCAATGGTTATGAAAC
 AGGTCTTGCCAGGTCTGATTGGATGCCACAGGAATCAGTCTATTGGCATGTGATTGGAAATGGCACCACCTCTGAAGT
 GCACTCAATATTCTCGAAGTCACACATTCTGTGAGGAACCATGCCAGGCCTTGGAAATCTGCCAATAACTT
 TCCTTACTGCTCAAACACTCTTGATGGACCTTGGACAGTTCTACTGTTGTATATCTCTTCCACCAACATGATGGC
 ATGGAAGCTTATGTCAGACAGCTGTCCAGAGGAACCCAACTACGAATGAAAATAATGAAGAACGGAGACTA
 TGATGATGATCTTACTGAAATGGATGTGGTCAGGTTGATGATGACAACCTCCTTCTTATCCAAATTGCT
 CAGTTGCCAAGAACATCTAAACTTGGGTACATTACATTGCTGCTGAAGAGGGAGACTGGACTATGCTCCCTTAGTC
 CTCGCCCGATGACAGAAGTTATAAGTCATATTGAACAATGCCCTCAGGGATTGGTAGGAAGTACAAAAAGT
 CCGATTTATGGCATACACAGATGAAACCTTAAGACTCGTGAAGCTATTGAGCATGAATCAGGAATCTGGACCTTAC
 TTTATGGGAAGTTGGAGACACACTGTTGATTATTTAAGAATCAAGCAAGCAGACCATATAACATCTACCCCTCACGG
 ATCACTGATGTCGCCCTTGATTCAAGGAGATTACAAAAGGTGAAAACATTGAAGGATTTCCTGCCAG
 AGAAAATATTCAAATATAATGGACAGTGAATGACTGAGAACATGGCCAACTAAACATGACATCTCGGTGCTGACCCGCTATT
 ACTCTAGTTGTTAATATGGAGAGAGACTAGCTTCAGGACTCATGGCCCTCCTCATCTGCTACAAAGAACATCTGTA
 GATCAAAGAGGAACCAAGATAATGTCAGACAAGAGGAATGTCATCCTGTTCTGTATTGATGAGAACCGAAGCTGGTA
 CCTCACAGAGAATATACAACGCTTCTCCCACATCCAGCTGGAGTGCAGCTTGCAGGATCCAGAGTTCCAAGCCTCCAACA
 TCATGCACAGCATCAATGGCTATGTTTGATAGTTGCAGTTGTCAGTTGTTGCATGAGGTGGCATACTGGTACATT
 CTAAGCATTGGAGCACAGACTGACTTCCTTCTGTCTGATGAGGATACCTCAAACACAAAATGGTCTATGAAGA

FIG. 5A

CACACTCACCTATTCCCATTCTCAGGAGAAACTGTCTTCATGTCGATGGAAAACCCAGGTCTATGGATTCTGGGTGCC
 ACAACTCAGACTTCCGAACAGAGGCATGACCGCCTACTGAAGGTTCTAGTTGTGACAAGAACACTGGTATTATTAC
 GAGGACAGTTATGAAGATATTCAGCATACTGCTGAGTAAAACAATGCCATTGAACCAAGAAGCTTCGAAATAACTCG
 TACTACTCTTCAGTCAGATCAAGAGGAAATTGACTATGATGATACCATACTAGTTGAAATGAAGAAGGAAGATTTGACA
 TTTATGATGAGGATGAAATCAGAGCCCCCGCAGCTTCAAAAGAAAACACGACACTATTTATTGCTGCAGTGGAGAGG
 CTCTGGGATTATGGGATGAGTAGCTCCCCACATGTTCTAAGAAACAGGGCTCAGAGTGGCAGTGTCCCTCAGTTCAAGAA
 AGTTGTTTCCAGGAATTACTGATGGCTCCTTACTCAGCCCTATACCGTGGAGAACTAAATGAACATTGGACTCC
 TGGGCCATATATAAGAGCAGAAGTGAAGATAATATCATGGTAACCTTCAGAAATCAGGCCTCTCGTCCCTATTCC
 TATTCTAGCCTTATTCTTATGAGGAAGATCAGAGGCAAGGAGCAGAACCTAGAAAAAAACTTGTCAAGCCTAATGAAAC
 CAAAACTTACTTTGAAAGTGAACATCATATGGCACCCACTAAAGATGAGTTGACTGCAAAGCCTGGCTTATTCT
 CTGATGTTGACCTGGAAAAAGATGTGCACTCAGGCCCTGATTGGACCCCTCTGGTCTGCCACACTAACACACTGAACCC
 GCTCATGGGAGACAAGTGACAGTACAGGAATTGCTCTGTTTCAACCATTGATGAGACAAAAGCTGGTACTTCAC
 TGAAAATATGGAAAGAAACTGCAGGGCTCCCTGCAATATCCAGATGGAAGATCCCACCTTAAAGAGAAATTATCGCTTCC
 ATGCAATCAATGGCTACATAATGGATACACTACCTGGCTTAGTAATGGCTCAGGATCAAAGGATTCGATGGTATGCTC
 AGCATGGGAGCAATGAAAACATCCATTCTATTCACTTCAGTGGACATGTTCACTGTACGAAAAAAAGAGGAGTATAA
 AATGGCACTGTACAATCTCTATCCAGGTGTTTGAGACAGTGGAAATGTTACCATCAAAGCTGGAATTGGCGGGTGG
 AATGCCATTGGCGAGCATCTACATGCTGGATGAGCACACTTTCTGGTCTACAGCAATAAGTGTCAAGACTCCCTG
 GGAATGGCTTCTGGACACATTAGAGATTCAGATTACAGCTTCAGGACAATATGGACAGTGGGCCAAAGCTGGCAG
 ACTTCATTATTCCGGATCAATGCCTGGAGCACCAAGGAGCCCTTCTGGATCAAGGTGGATCTGGCACCAA
 TGATTATTACGGCATCAAGACCCAGGGTCCCCGTCAGAAGTCTCCAGCCTACATCTCAGTTATCATCATGTAT
 AGCTTGATGGAAGAAGTGGCAGACTTATCGAGGAATTCCACTGGAACCTTAATGGTCTTCTGGCAATGTGGATTC
 ATCTGGGATAAAACACAATATTTAACCTCCAATTATTGCTCGATACATCCGTTGCACCCAACTCATTATAGCATT
 GCAGCACTTCGCATGGAGTTGATGGCTGTGATTAAATAGTGCAGCATGCCATTGGGAATGGAGAGTAAAGCAATA
 TCAGATGCACAGATTACTGCTTCATCCTACTTACCAATATGTTGCCACCTGGTCTCCTCAAAGCTGACTTCACCT
 CCAAGGGAGGAGTAATGCCCTGGAGACCTCAGGTGAATAATCCAAAAGAGTGGCTGCAAGTGGACTTCAGAAGACAATGA
 AAGTCACAGGAGTAACTACTCAGGGAGTAAAATCTCTGCTTACAGCATGTATGTGAAGGAGTCCCTCATCTCCAGCAGT
 CAAGATGCCATCAGTGGACTCTTTTCAGAATGGCAAAGTAAAGGTTTCAGGAAATCAAGACTCCCTCACACC
 TGTGGTGAACTCTAGACCCACCGTTACTGACTCGTACCTTCGAATTCCCCCAGAGTTGGGTGCACCAAGATTGCC
 TGAGGATGGAGGTTCTGGCTGCGAGGCACAGGACCTACTGACTCGAGAATAAAAGATCAGAGCTTAGAGATCTGTG
 TGTTGGTTTTGTGCGGGCGAGGAACCCCTAGTGATGGAGTTGCCACTCCCTCTGCGCGCTCGCTCCTCA
 GAGGCCGGCGACCAAAGTCGCCGACGCCGGCTTGCCTGGGGCGCTCAGTGGAGCGAGCGAGCGCCAGCTGCC
 GCAGGACATGTGAGCAAAGGCCAGCAAAGGCCAGGAACCGTAAAAGGCCGTTGCTGGCTTTCCATAGGCTCC
 GCCCCCCCTGACGAGGATCACAAAATCGACGCTCAAGTCAGAGGTGGCAGAACCGACAGGACTATAAGATACCGCG
 TTTCCCCCTGGAAGCTCCCTCGCGCTCCTGTTCCGACCCCTGCCGTTACCGGATACCTGTCGCCCTTCTCCCTC
 GGGAGCGTGGCGTTCTAGCTCACGCTGTAGGTATCTCAGTTGGCTGAGGCTACAGAGTTCTGAAGT
 TGACGAAACCCCGTTAGCCGACCGCTGCGCTTACCGGTAACATCTGCTGAGTCCAAACCCGTAAGACACGAC
 TTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTGAAGT
 GTGGCCTAACTACGGCTACACTAGAAGGACAGTATTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGAAAAGAG
 TTGGTAGCTTGTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTGTTGCAAGCAGCAGATTACGCGCAGA
 AAAAAGGATCTCAAGAAGATCTTGTACCTTCTACGGGTCTGACGCTCAGTGGAAAGAAAACTCACGTTAAGGGAT

TTTGGTCATGAGATTATCAAAAGGATCTCACCTAGATCCTTTAAATTAAAAATGAAGTTAAATCAATCTAAAGTA
 TATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTCGTTCA
 TCCATAGTTGCCTGACTCCCCGTCGTAGATAACTACGATAACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGAT
 ACCCGCAGACCCACGCTCACCGGCTCCAGATTATCAGCAATAAACACCAGCCAGCCGAAGGGCCGAGCGCAGAAGTGGTC
 CTGCAACTTATCCGCCTCCATCCAGTCTATTAAATTGTTGCCGGAAAGCTAGAGTAAGTAGTTGCCAGTTAATAGTTG
 CGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTCACTGCTCGTCTGGTATGGCTTCAATTGCTCCGGTCCGATCGTTGTCAGAA
 GTAAGTTGCCGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTTACTGTCACTGCCATCCGTAAGATGC
 TTTCTGTGACTGGTGAGTACTCAACCAAGTCATTGAGAATAGTGATGCCGACCGAGTTGCTCTGCCCGCGTC
 AATACGGATAATACCGGCCACATAGCAGAACTTAAAAGTCTCATCATTGAAAACGTTCTCGGGCGAAAACCTCT
 CAAGGATCTTACCGCTGTTGAGATCCAGTTGATGTAACCCACTCGCACCCAACTGATCTCAGCATTTTACTTTC
 ACCAGCGTTCTGGGTGAGCAAAACAGGAAGGCAAAATGCCCAAAAGGGAATAAGGGCGACACGGAAATGTTGAAT
 ACTCATACTCTCCTTTCAATATTATTGAAAGCATTATCAGGGTTATTGTCATGAGCGGATACATATTGAATGTA
 TTAGAAAATAACAAATAGGGTTCCGCGCACATTCCCGAAAAGTCCACGTTGACGTCTAAGAAACCATATTATC
 ATGACATTAACCTATAAAATAGGCATACGAGGCTTACAGGCCCCTTCGTCAGGGTCTCGCGCTTGGTATGACGGTAAAACCTCTG
 ACACATGCAGCTCCGGAGACGGTCACAGCTTGTCTGTAAGCGGATGCCGGAGCAGACAAGCCGTCAGGGCGCTAG
 CGGGTGTGGCGGGTGTGGCTTAACTATGCGGCATCAGAGCAGATTGACTGAGAGTGCACCATAAAATTGTA
 AACGTTAATATTGTTAAAATTGCGTTAAATTGTTAAATCAGCTCATTAAACCAATAGGCCGAAATCGGAA
 AATCCCTATAAAATCAAAGAATAGCCCAGAGATAGGGTTGAGTGTGTTCCAGTTGGAACAAGAGTCCACTATTAAAGA
 ACGTGGACTCCAACGTCAAAGGGCAAAACCGTCTATCAGGGCAGTGGCCACTACGTGAACCATCACCCAAATCAAGT
 TTTTGGGTCAGGTGCCGTTAACGCACTAAATCGAACCCCTAAAGGGAGCCCCGATTTAGAGCTTGACGGGAAAGCC
 GCGAACGTGGCAGAAAGGAAGGAAAGCGAAAGGAGCGCTAGGGCGCTGGCAAGTGTAGCGGTACGCTGC
 GCGTAACCACCAACCCGCCGCTTAATCGCCGCTACAGGGCGTACTATGTTGCTTGTACGTATGGTGTGAAA
 TACCGCACAGATGCGTAAGGAGAAAATACCGCATCAGGCCGTAACCTGTCGGATCACCGAAAGGACCGTAAAGTGATA
 ATGATTATCATCTACATATCACAACGTGCGTGGAGGCCATCAAACACGTCAAATAATCAATTATGACGCAGGTATCGTA
 TTAATTGATCTGCATCAACTAACGTTAAAACAACCTCAGACAATAACAAATCAGGCACACTGAATAACGGGCAACCTCAT
 GTCAACGAAGAACAGAACCCGAGAACACAACACCGAACATCCGCTTCTTAACCAATGATTGAACAAATTACATCG
 CTCTTGAGCAAAAGGGTCCGGAAATTCTCAGCCTGGTCATTGAAGCCTGCCGTGGAGACTAACGTCAGAAAGAGA
 GCATATACATCAATTAAAGTGTGAAGAATGAACATCCCGCTTCCCTCCGAACAGGACGATATTGAAATTCACT
 TAATTACGAGGGCATTGCGAGTAATTGAGTTGAGCTTACCACTTCTGACAGTGCAGACTGCGTGTGGCTCTGTCA
 CAGACTAAATAGTTGAATGATTAGCAGTTGATCAGTCAACCACCAAGGGAAATAATCCTCATATTATTATCGTC
 TTCACCAACGCTGCCCAATTGCTCTGAAATGCTCCAGAGACACCTTATGTTCTATACATGCAATTACAACATCAGGGTA
 ACTCATAGAAATGGTGTATTAAGCATATTTCACGAATCAGATCCACGGAGGGATCATCAGCAGATTGTTCTTAT
 TCATTGTCGCTCCATGCGCTGCTCTTCATCTAGGGTAAATTACTTCAAATCTTCTGTATGAAAGATTGAGC
 ACGTTGGCCTTACATACATCTGCGTTGTTATTCCTCCAGAATGCCAGGACCGCAGTTGTTACGCAACCAATAC
 TATTAAGTGAACATTCCTAAATTGACATAAAATCATCAACAAACACAAGGAGGTCAAGGACGATATTGAAACGATAAA
 AACGATAATGCAAACACGCGCCCTCGTATCACATGGAAGGTTTACCAATGGCTCAGGTTGCCATTAAAGAAATAT
 TCGATCAAGTGCAGAAAGATTAGACTGTGAATTGTTTATTCTGAACTAAACGTCACAACGTCTCACATTATATTAC
 TATCTAGCCACAGATAATTACATCGTGTAGAAACGATAACACCGTGTAAATTAAAGGACTAAAAGGTTGAAA
 TGTTAAATTCTCAAGAAACACGCATCTTATAGAAACGTCCTATGATAGGTTGAAATCAAGAGAAATCACATTGCAAT
 ACAGGGAAATCTTGTAAAGCAGGAGTTCCGATGGTTACAAATATCCATGAACATAAAAGATATTACTACCTT

FIG. 5C

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GATAATTCAATTACTATTTACTGAGAGCATTAGAACACTACACAAATCTTCCACGCTAAATCATACGTCCGGTTCTT
CCGTGTCAGCACCGGGCGTTGGCATAATGCAATACGTGTACCGCTAAACCCCTGTGTGCATCGTTAATTATTCCCG
ACACTCCCCAGAGAAGTCCCCGTCAAGGGCTGTGGACATAGTTAATCCGGAATACAATGACGATTCATCGCACCTGAC
ATACATTAATAAATATTAACAATATGAAATTCAACTCATTGTTAGGGTTGTTAATTTCACACATACGATTCTGC
GAACATTCAAAAAGCATCGGAATAACACCAGAAAAAAATGCTACTCGCTACTGCCGTGGCCCTGCTTATTACAGGATGT
GCTCAACAGACGTTACTGTTCAAACAAACCGGCAGCAGTAGCACCAGGAAACCACATCACCACATTCCTCGTTTC
TGGAATTGGGCAGAAGAAAATGTCGATGCAGCAGCAGGAAATTTGTGGCGGCAGAAAATGTTGTTAAAACAGAAACCCAGC
AAACATTGTAATGGATTGCTCGGTTTATTACTTTAGGCATTACTCCGCTGGAAGCGCGTGTATTGCTCACAA
TAATTGCACTGAGTTGCCCATCGCAGATATGGGCAACTCTATCTGCACTGCTCATTAATATACTCTGGGTTCCCTCAGTT
GTTTTGCATAGTGTACGAGCCTCTCTGAGGGTGAATAATCCGTTAGCAGCTAACCTCGTGTATTGCACTGAGCCAGAACAT
TTATCCACGCCGGAGGCAGGCTTCACGCACTGACTGACAGACTGCTTGATGTCAACCGACGACGACCAGCC
AACATCATCACGAGAGCATCTTCAGCTTAGCAGCTAACCTCGTGTATTGCACTGAGCCAGAACAT
CACGCTGACGCATCTGAGCTAACGAGCAGCTAACGAGGCTTCAGCTCTGAGGAGATAAT
TAGGTAATGGCATTACCGTAATGATTAACAGCCATGACAGGAGCAGATGATGCAAGATAACCAGAGCGGAGATAAT
CGCGGTGACTCTGCTCATACATCAATCTCTGACCGTTCCGCCGCTTGAATTGCAATCAGGCTGTAGCCT
ATGCTGAACTGACCATAACCAGCGCCGGCAGTGAAGCCCAGATAATTGCTGCAACGGTCATTGCTGACGGATATCAC
CACGATCAATCATAGTAAAGGCCACGCTCCTTAATCTGCTGCAATGCCACAGCGTCTGACTTTCGAGAGAGAGTCT
TTCAGGCCAGCTGCTGGTAGGCATCCCACCAACGGGAAAGAAGCTGGTAGCGTCCGGCCTGTTGATTGAGTT
TGGGTTAGCGTACAAGTTGCGAGGGTGTGGAGTAATCAGTAATAGCTCTCCGCTACAATGACGTATAACC
GATTTCTGGTTTCTGACGTCCGTTACGTTCCCTCCGACCACGCCAGCATATCGAGGAACGCCCTACGTTGATTATTG
ATTCTACCATCTTCACTCCGCTTTTAGCAGCGAAGCGTTGATAAGCGAACCAATCGAGTCAGTACCGATGTAGC
CGATAAACACGCTCGTTATATAAGCGAGATTGCTACTTAGTCCGGCGAAGTCGAGAAGGTACGAATGAACCAGGC
ATGGCGCACATCGTGCCTGATTACTGTTTGTAAACGCACCGCATTATATCTGCCGGAAGGTACGCCATTGCAAA
CGCAAGGATTGCCCGATGCCCTGTTCTTGCCGAGAATGGCGCCAACAGGTCACTGTTCTGGCATCTCATGT
CTTACCCCCAATAAGGGATTGCTCTATTAAATTAGGAATAAGGTCGATTACTGATAGAACAAATCCAGGCTACTGTGT
TTAGTAATCAGATTGTTGCTGACCGATATGCACGGCAAACGGCAGGAGGTTGTTAGCGCAGCTCTGCCACCCGCT
TTCACGAAGGTATGTTAAAGGCCGAGCGTAACATTACTAATGAATTCAAGGACAGACAGTGGCTACGGCTCAGTT
GGGTTGTGCTGTTGCTGGCGCGATGACGCCGTACGCATTGGTGTGATCCGGTCTGCTCCGGTATTGCTTAATTCA
GCACAAACGGAAAGAGCACTGGCTAACCAAGGCTGCCACTCTCACGATTATCGACTCAATGCTCTACCTGTTGCTGAG
ATATAAAAATCCGAAACCGTTATGCAAGGCTCTAACTATTACCTGCGAATGCACTGTTGGGATTGCATTGCAAGACCTCT
CTGCCTGCGATGGTTGGAGTTCCAGACGATACGTGAAGTGAACCAACTAGGCGGAATCGTAGTAAGCGCCCTCTTT
CATCTCACTACCACAAACGAGCAATTAAACCCATCGTGTGAGTCAAAATTACCAATTATTCAATAAGTCATATCATGC
CGTTAATATGTTGCCATCCGTGCAATCATGCTGCTAACGTGTGACCGCATTCAAAATGTTGCTGCGATTGACTCTCT
TTGTGGCATTGCACCAACCGAGCGTCATACAGGGCTTAACAGTGCAGCAGGTTGGGTTGGTAAGGTTGGGATTAG
CATCGTCACAGCGCGATATGCTGCGCTTGGCATCCTGAAATAGCGACGCCCTTGCATCTCCGACTCTTCTCGA
CAACTCTCCCCACAGCTCTGTTGGCAATATCAACCGCACGCCGTGACCATGGCAATCTGCACTCTGCCCTGGC
GTCGCGGCACTACGGCAATAATCCGATAAGCGAATGTTGCGAGCACTTGCAGTACCTTGCCTTAGTATTCTTCAG
CTGCCCTGCAGG

FIG. 5D

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FIG. 6A

FIG. 6B

FIG. 6C

FIG. 6 SEQ ID NO. 14

CGCCCCTGCAGGCAGCTGCGCGTCGCTCGCTCACTGAGGCCGCCGGCAA
AGCCCAGGGCGTCGGCGACCTTGGTCGCCCGGCCTCAGTGAGCGAGCGAGC
GCGCAGAGAGGGAGTGGCCAACTCCATCACTAGGGGTTCCCTGCGGCCGCACG
CGTGGTGGCGCGGGTAAACTGGGAAAGTGATGTCGTACTGGCTCCGCCT
TTTCCCCGAGGGTGGGGAGAACCGTATATAAGTGCAGTAGTCGCCGTGAAC
GTTCTTTTCGCAACGGGTTGCCGCCCGCAGGTAAAGTGCCAGGAAAT
GTTGTTCTTAAATACCATCGCTCCAGGAAATGTTGTTCTTAAATACCATC
TACTGACACTGACATCCACTTTCTTCTCCACAGGTATCGATCCACCA
TGCAAATAGAGCTCTCACCTGCTTCTGTGCCTTGCATTGCTT
TAGTGCACCAGAAGATACTACCTGGGTGCAGTGGAACTGTATGGACTAT
ATGCAAAGTGATCTGGTGAGCTGCCGTGGACGCAAGATTCCCTAGAG
TGCCAAAATCTTCCATTCAACACCTCAGTCGTACAAAAAGACTCTGTT
TGTAGAATTCA CGGATCACCTTCAACATCGCTAACGCCAGGCCACCCCTGG
ATGGGTCTGCTAGGTCTACCATCCAGGCTGAGGTTATGATACTGGTCA
TTACACTTAAGAACATGGCTCCATCCTGTCAGTCTCATGCTGTTGGTGT
ATCCTACTGGAAAGCTCTGAGGGAGCTGAATATGATGATCAGACCAAGTCAA
AGGGAGAAAGAAGATGATAAGTCTCCCTGGTGGAAAGCCATACATATGTCT
GGCAGGTCTGAAAGAGAATGGTCCAATGGCCTCTGACCCACTGTGCCTTAC
CTACTCATATCTTCTCATGTGGACCTGGTAAAAGACTTGAATTCAAGGCCTC
ATTGGAGCCCTACTAGTATGTAGAGAAGGGAGTCTGGCCAAGGAAAAGACAC
AGACCTTGCACAAATTATACTACTTTGCTGTATTGATGAAGGGAAAAG
TTGGCACTCAGAAACAAAGAACTCCTGATGCAGGATAGGGATGCTGCATCT
GCTCGGGCCTGGCCTAAATGCACACAGTCAATGGTTATGAAACAGGTCTC
TGCCAGGTCTGATTGGATGCCACAGGAAATCAGTCTATTGGCATGTGATTGG
AATGGGCACCACTCCTGAAGTGCACTCAATATTCCCTGAAGGTACACACATT
CTTGTGAGGAACCATGCCAGGGCTTGGAAATCTGCCAATAACTTCC
TTACTGCTCAAACACTCTTGATGGACCTGGACAGTTCTACTGTTGTCA
TATCTCTCCCACCAACATGATGGCATGGAAGCTTATGTCAAAGTAGACAGC
TGTCCAGAGGAACCCCAACTACGAATGAAAAATAATGAAGAACGGAAAGACT
ATGATGATGATCTTACTGATTCTGAAATGGATGTGGTCAGGTTGATGATGA
CAACTCTCCTTATCCAAATTGCTCAGTTGCCAAGAACGATCCTAAA

FIG. 6A

ACTTGGGTACATTACATTGCTGCTGAAGAGGGAGGACTGGGACTATGCTCCCT
TAGTCCTCGCCCCCGATGACAGAAGTTATAAAAGTCATATTGAACAATGG
CCCTCAGCGGATTGGTAGGAAGTACAAAAAAAGTCCGATTATGGCATAACACA
GATGAAACCTTAAGACTCGTGAAGCTATTCAAGCATGAATCAGGAATCTGG
GACCTTACTTATGGGAAGTTGGAGACACACTGTTGATTATTTAAGAA
TCAAGCAAGCAGACCATAAACATCTACCCCTCACGGAATCACTGATGTCCGT
CCTTGATTCAAGGAGATTACCAAAAGGTGTAAAACATTGAAGGATTTTC
CAATTCTGCCAGGAGAAATATTCAAATATAATGGACAGTGACTGTAGAAGA
TGGGCCAACTAAATCAGATCCTCGGTGCCTGACCCGCTATTACTCTAGTTTC
GTTAATATGGAGAGAGATCTAGCTTCAGGACTCATTGGCCCTCCTCATCT
GCTACAAAGAACATCTGTAGATCAAAGAGGAAACCAAGATAATGTCAGACAAGAG
GAATGTCATCCTGTTCTGTATTGATGAGAACCGAAGCTGGTACCTCACA
GAGAATATAACACGCTTCTCCCAATCCAGCTGGAGTGCAGCTTGAGGATC
CAGAGTTCCAAGCCTCCAACATCATGCACAGCATCAATGGCTATGTTTGA
TAGTTGCAGTTGTCAGTTGTCATGAGGTGGCATACTGGTACATTCTA
AGCATTGGAGCACAGACTGACTTCCTTCTGTCTTCTGGATATACCT
TCAAACACAAAATGGTCTATGAAGACACACTCACCCATTCCCATTCTCAGG
AGAAAATGTCTTCATGTCGATGGAAAACCCAGGTCTATGGATTCTGGGGTGC
CACAACTCAGACTTCGGAACAGAGGCATGACCGCCTACTGAAGGTTCTA
GTTGTGACAAGAACACTGGTATTACGAGGACAGTTATGAAGATATTTC
AGCATACTGCTGAGTAAAACAAATGCCATTGAACCAAGAACGCTTCTCCAG
AATCCACCAGTCTGAAACGCCATCAACCGAAATAACTCGTACTACTCTTC
AGTCAGATCAAGAGGAAATTGACTATGATGATACCATACAGTTGAAATGAA
GAAGGAAGATTGACATTATGATGAGGATGAAAATCAGAGCCCCCGCAGC
TTTCAAAAGAAAACACGACACTATTTATTGCTGCAGTGGAGAGGCTCTGGG
ATTATGGATGAGTAGCTCCCCACATGTTCTAAGAAACAGGGCTCAGAGTGG
CAGTGTCCCTCAGTTCAAGAAAGTTGTTCCAGGAATTACTGATGGCTCC
TTTACTCAGCCCTATACCGTGGAGAACTAAATGAACATTGGACTCCTGG
GCCATATATAAGAGCAGAAGTTGAAGATAATCATGGTAACCTTCAGAAA
TCAGGCCTCTCGTCCCTATTCTTCTATTCTAGCCTATTCTTATGAGGAA
GATCAGAGGCAAGGAGCAGAACCTAGAAAAAAACTTGTCAAGCCTAATGAAA
CCAAAATCTACTTTGGAAAGTGCACATCATGGCACCCACTAAAGATGA
GTTGACTGCAAAGCCTGGCTTATTCTCTGATGTTGACCTGGAAAAAGAT
GTGCACTCAGGCCTGATTGGACCCCTCTGGTCTGCCACACTAACACACTGA
ACCCCTGCTCATGGGAGACAAGTGACAGTACAGGAATTGCTCTGTTTAC
CATCTTGATGAGACCAAAAGCTGGTACTTCAGTGAAGATCCCACCTTTAAAGAGAATT
TGCAGGGCTCCCTGCAATATCCAGATGGAAGATCCCACCTTTAAAGAGAATT
ATCGCTTCCATGCAATCAATGGCTACATAATGGATAACTACCTGGCTTAGT
AATGGCTCAGGATCAAAGGATTGATGGTATCTGCTCAGCATGGCAGCAAT

FIG. 6B

GAAAACATCCATTCTATTCAATTCAAGTGGACATGTGTTCACTGTACGAAAAA
AAGAGGAGTATAAAATGGCACTGTACAATCTCTATCCAGGTGTTTGAGAC
AGTGGAAATGTTACCCTACCAAAGCTGGAATTGGCGGGTGGAAATGCCTTATT
GGCGAGCATCTACATGCTGGATGAGCACACTTTCTGGTGTACAGCAATA
AGTGTCAAGACTCCCCGGGAATGGCTTCTGGACACATTAGAGATTTCAGAT
TACAGCTTCAGGACAATATGGACAGTGGGCCAAAGCTGGCCAGACTTCAT
TATTCCGGATCAATCAATGCCTGGAGCACCAAGGAGCCCTTTCTGGATCA
AGGTGGATCTGTTGGCACCAATGATTATTACGGCATCAAGACCCAGGGTGC
CCGTCAGAACAGTTCTCCAGCCTCTACATCTCAGTTATCATCATGTATAGT
CTTGATGGGAAGAAGTGGCAGACTTATCGAGGAAATTCCACTGGAACCTTAA
TGGTCTTCTTGGCAATGTGGATTCATCTGGATAAAACACAATATTTTAA
CCCTCCAATTATTGCTCGATACATCCGTTGCACCCAACTCATTATAGCATT
CGCAGCACTTCGCATGGAGTTGATGGCTGTGATTTAAATAGTTGCAGCA
TGCCATTGGGAATGGAGAGTAAAGCAATATCAGATGCACAGATTACTGCTTC
ATCCTACTTACCAATATGTTGCCACCTGGTCTCCTTCAAAAGCTCGACTT
CACCTCCAAGGGAGGAGTAATGCCTGGAGACCTCAGGTGAATAATCCAAAAG
AGTGGCTGCAAGTGGACTTCCAGAACAGACAATGAAAGTCACAGGAGTAAC
TCAGGGAGTAAATCTCTGCTTACCAAGCATGTATGTGAAGGAGTTCCCTCATC
TCCAGCAGTCAAGATGCCATCAGTGGACTCTCTTTTCAAGATGGCAAAG
TAAAGGTTTCAGGGAAATCAAGACTCCTCACACCTGTGGTGAACCTCT
AGACCCACCGTTACTGACTCGCTACCTCGAATTCAACCCCCAGAGTTGGGTG
CACCAAGATTGCCCTGAGGATGGAGGTTCTGGGCTGCGAGGCACAGGACCTCT
ACTGACTCGAGCCTAATAAAGGAAATTATTTCAATTGCAATAGTGTGTTGG
TTTTTGTGTGCGGCCGCGAGGAACCCCTAGTGATGGAGTTGGCCACTCCCTC
TCTGCGCGCTCGCTCGACTGAGGCCGGCGACCAAGGTGCCCCGACGC
CCGGGCTTGGCCGGCGGCCTCAGTGAGCGAGCGAGCGCAGCTGCCTGC
AGGACAT

FIG. 6C